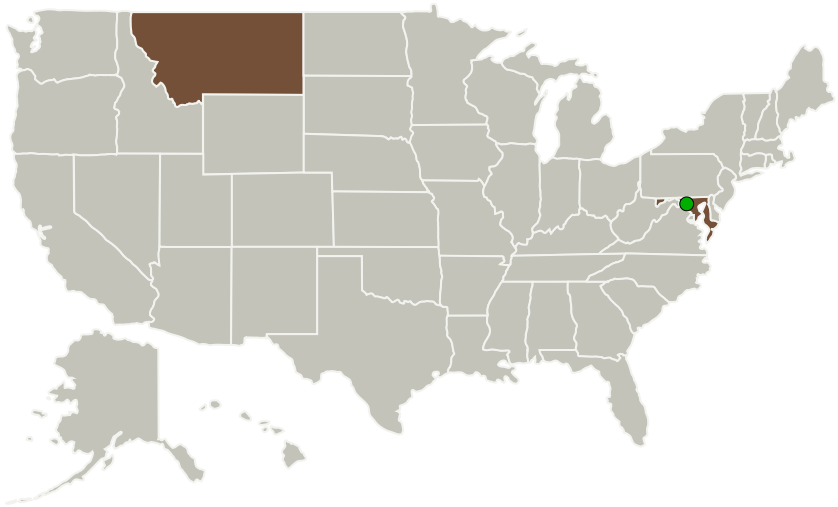
High Power, Thermally Optimized Blue Laser for Lidar, Phase II

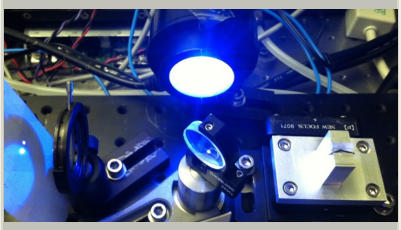
Completed Technology Project (2017 - 2020)

Project Introduction

To enable widespread and rapid airborne bathymetric lidar to adequate depths in many ocean regions a low-cost, rugged, and high energy pulsed laser source must be developed in the ocean water transmittance spectrum of 450 - 490 nm. The ideal laser source will be high performance for lidar (high pulse energy, high rep rate, short pulse duration) with specific targeted emission spectrum to meet ocean water transmittance and filtering requirements. It will also feature low SWaP and a rugged form factor with high reliability for continual use on mobile platforms. No existing laser source can meet these demanding requirements. To address this challenge and meet NASA's lidar source needs, Bridger Photonics, Inc. (Bridger) proposes creating a high power Q-switched, off-line Nd:YAG source at 946 nm, which, when frequency doubled to 473 nm, will provide high transmittance through ocean waters. Bridger's design will leverage three key innovations proven out in its Phase I effort: efficient, end-pumped, low-quantum-defect architecture; gain crystal design for optimal heat removal; and robust monolithic, alignment-free fabrication. The proposed design would allow for widespread deployment of mobile ocean-penetrating lidar transmitters. Successful completion of this Phase II effort will allow Bridger to demonstrate >10 W of average blue power in a compact, turn-key package. Bridger has modeled and constructed similar lasers through SBIR efforts previously and will apply the innovations developed there towards this new system for NASA.

Primary U.S. Work Locations and Key Partners





High Power, Thermally Optimized Blue Laser for Lidar, Phase II Briefing Chart Image

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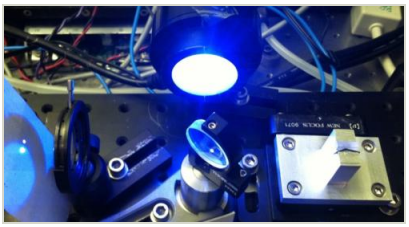
Organizations Performing Work	Role	Type	Location
Bridger Photonics, Inc.	Lead Organization	Industry	Bozeman, Montana
Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Maryland	Montana

Images



Briefing Chart Image
High Power, Thermally Optimized Blue Laser for Lidar, Phase II Briefing Chart Image
(https://techport.nasa.gov/image/128235)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Bridger Photonics, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

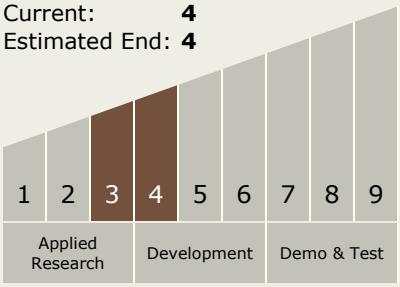
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Jason Brasseur

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.5 Lasers

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System